

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 39-43 and 61-78 are pending in the application, with 39, 61, 66, and 67 being the independent claims. Claims 1-13 were previously cancelled. Claims 14-38 and 44-60 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claims 61-67 were withdrawn by the Examiner. New claims 68-78 are sought to be added. Claims 39, 40, and 42 are sought to be amended. Claim 39 is amended to further clarify the claimed embodiments of the present invention, not to amend around art. Claims 40 and 42 are amended to clarify antecedent basis. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 39-41

Page three of the Office Action states that claims 39-41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,285,352 to Pastore *et al.* (hereinafter Pastore) in view of U.S. Patent No. 6,011,304 to Mertol (hereinafter Mertol). Applicants respectfully traverse these rejections and request that they be withdrawn.

As amended, claim 39 recites:

A ball grid array (BGA) package, comprising:

a substrate that has opposing first and second surfaces, wherein said substrate has a window opening through said substrate that is open at said first surface and said second surface;

a stiffener that has a first surface attached to said second surface of said substrate, wherein said stiffener further has a second surface having a mounting location for an integrated circuit (IC) die; and

a heat slug that has a first surface attached to a portion of said first surface of said stiffener through said window opening, wherein said heat slug has a second surface that is capable of being mounted to a printed circuit board (PCB);

wherein said portion of said first surface of said stiffener includes a first portion of a locking mechanism and said first surface of said heat slug includes a second portion of said locking mechanism, wherein said locking mechanism aligns said heat slug with said stiffener when coupled together.

Pastore and Mertol, alone or in combination, do not teach or suggest all of these features of independent claim 39.

For example, Pastore does not describe a stiffener that has a first surface attached to a second surface of a substrate, as recited in claim 39. Pastore states:

Device 35 of FIG. 2 includes semiconductor die 12 mounted over a plated, metallized area 37 formed on the top surface of substrate 14.

Metallized area 37, like traces 18, will usually include two layers, a

laminated conductive layer with an overlying plated conductive layer.

(Col. 5, line 68-Col. 6, line 6).

Therefore, according to Pastore, metallized area 37 is structurally trace-like. Furthermore, Pastore explains that the two-fold purpose of metallized area 37 is to provide additional area for thermal conduction and to be used as a ground plane (Col. 6, lines 20-28). Thus, Pastore does not teach or suggest a stiffener that has a first surface attached to the second surface of a substrate, and does not teach or suggest a heat slug that has a first surface attached to a portion of the first surface of the stiffener through a window opening in the substrate, as recited in claim 39.

Furthermore, Mertol does not provide the teachings missing from Pastore. For example, Mertol describes a stiffener 11, which has an opening 13 for encapsulant, attached to a package substrate 2 (Col. 5, lines 9,10, and 52). "Encapsulant 6 fills the inner opening of the stiffener. The stiffener comprises four holes 12, one at the center of each side of the stiffener 11." (Col. 5, lines 53-56; FIG. 5B). However, Mertol does not teach or suggest a heat slug that has a first surface attached to a portion of the first surface of the stiffener through a window opening in the substrate, as recited in claim 39.

Accordingly, Applicants assert that independent claim 39 is patentable over Pastore and Mertol for at least these reasons. Claims 40-41 and new claims 68-78, which depend from claim 39, are also patentable over Pastore and Mertol for at least these reasons, and further in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 39-41.

Claims 42 and 43

Page five of the Office Action states that claims 42 and 43 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pastore in view of Mertol, as applied to claims 39-41 above, and further in view of U.S. Patent No. 6,552,266 to Carden (hereinafter Carden) or U.S. Patent No. 5,998,241 to Niwa (hereinafter Niwa).

Applicants respectfully traverse these rejections and request that they be withdrawn.

As described above, independent claim 39 is patentable over Pastore and Mertol, alone or in combination, for at least the reasons described above. Furthermore, Carden or Niwa do not provide the missing teachings as to independent claim 39. Therefore, claims 42 and 43, which depend from claim 39, are patentable over Pastore, Mertol, and Carden or Niwa, for at least the reasons described above, and further in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 42 and 43.

Other Matters

Page six of the Office Action states that claims 39-43 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-45 of U.S. Patent Application No. 10/284,166, claims 1-12, 22, and 24-32 of U.S. Patent Application No. 10/284,312, and claims 14-22 of U.S. Patent Application Nos. 10/201,309, 10/284,371, 10/200,336, 10/201,893, 10/201,891, 10/197,438, and 09/742,366.

Applicants respectfully request that these rejections be held in abeyance until allowable subject matter is indicated.

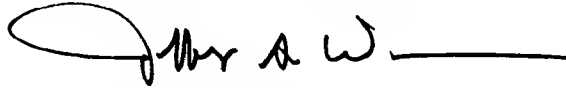
Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.

A handwritten signature in dark ink, appearing to read 'Jeffrey S. Weaver', followed by a horizontal line.

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